OPERATOR'S MANUAL

MANOSTAT® VARISTALTIC® PUMP DRIVES MODELS

	115V	230V
SIMON®	72-310-000	72-310-230
SIMON W/REMOTE	72-312-000	72-312-230
VERA®	72-315-000	72-315-230
VERA W/REMOTE	72-317-000	72-317-230
PRESTON®	72-370-000	72-370-230
PRESTON W/REMOTE	72-372-000	72-372-230

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MP MASTER
MA29158

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CAUTIONS/WARNINGS

CAUTION:

Tubing breakage may result in fluid being sprayed from pump. Use appropriate measures to protect operator and equipment. The Manostat varistaltic drives should be plugged into grounded outlets only.

CAUTION:

Turn drive off before removing or installing tubing. Fingers or loose clothing could be caught in the drive/pump mechanism.

CAUTION: Changing Flow Direction

When changing flow direction, allow the pump to come to a complete stop before starting again. Failure to do so could cause permanent damage to the motor.

WARNING:

PRODUCT USE LIMITATION

These products are not designed for, nor intended for use in patient connected applications; including, but not limited to medical and dental use, and accordingly have not been submitted for FDA approval.

INTRODUCTION & GENERAL DESCRIPTION

Trademarks bearing the ® symbol in this publication are registered in the U.S and in other countries.

The Manostat variable speed drives provide continuous pumping of fluids while power is supplied.
115V drives are UL and cUL listed. 230V drives are CE certified.

Model#	Description	Speed (RPM)
72-310-000	SIMON, Analog speed pot	115V 24-720 rpm
72-312-000	SIMON, with remote option & Analog speed pot	24-720 rpm 115V
72-310-230	SIMON, Analog speed pot	230V 24-720 rpm
72-312-230	SIMON, with remote option & Analog speed pot	24-720 rpm 230V
72-315-000	VERA, Digital speed pot	115V 24-720 rpm
72-317-000	VERA, with remote option & Digital speed pot	24-720 rpm 115V
72-315-230	VERA, Digital speed pot	230V 24-720 rpm
72-317-230	VERA, with remote option & Digital speed pot	24-720 rpm 230V
72-370-000	PRESTON, Digital speed pot	115v 24-720 rpm
72-372-000	PRESTON, with remote option & Digital speed pot	24-720 rpm 115V
72-370-230	PRESTON, Digital speed pot	230V24-720 rpm
72-372-230	PRESTON, with remote option & Digital speed pot	24-720 rpm 230V

SETUP & OPERATION

Unpack the drive and retain all packing material until proper product operation has been verified. Select the tubing according to the flow desired; while considering chemical compatibility and tubing life. Refer to the enclosed Chemical Resistance Chart to select appropriate type of tubing for the liquid in use.

Tubing Size Selection
Flow rate is determined by the size of the tubing in the pump head. When tubing links are used, best performance will be achieved when input and output tubing connected to the link are the same ID as the link. All tubing inside the pump head must use surface printed Manostat tubing.

Simon, Vera and Preston drives accept tubing ID sizes of 1/32" to 5/16".

For best results select a tubing size with a mid-range at the desired flow rate to be pumped. The table below gives an average of flow rates using silicone tubing measured with water at standard pressure and temperature. No lift or discharge pressure is represented. Higher flows can be achieved by using PharMed or Norprene tubings.

TUBING SELECTION CHART

Simon & Vera Pumps	Silicone Tubing Size	Preston Pumps
1-37 ml/min	1/32" ID*	2-40 ml/min
6-170	1/16" ID*	11-295
25-700	1/8" ID	44-1200
57-1700	3/16" ID	93-2490
91-2650	1/4" ID	170-4200
137-3475	5/16" ID	246-4950

PharMed Tubing Size

1-40 ml/min	1/32" ID (13)*	2-77 ml/min
8-210	1/16" ID (14)*	13-350
28-780	1/8" ID (16)	46-1250
60-1740	3/16" ID (25)	103-2800
96-2600	1/4" ID (17)	168-4200
121-3400	5/16" ID (18)	245-5500

Tygon Tubing Size

1-25 ml/min	1/32" ID (13)*	2-55 ml/min
6-185	1/16" ID (14)*	9-320
25-770	1/8" ID (16)	45-1250
60-1720	3/16" ID (25)	105-2850
96-2800	1/4" ID (17)	174-4800
120-3500	5/16" ID (18)	236-5400

* These sizes require tubing links.

OPERATION OF THE PUMP

Inserting Tubing

1. Make sure that the power switch is turned off.

2. Remove the plexiglass cover from the pump head.

3. FOR TUBING LINKS: Attach input and output ends of the transfer tubing to the connectors of the tubing link. Insert the tubing link so that the tie wraps or the flanges of the link are as close as possible to the outside of the pump head. Manually rotate the roller assembly and guide the tubing between the rollers and the pump head wall.
FOR TUBING: Insert tubing between the rollers and the pump head housing in the center of the channel (i.e. midway between the plexiglass pump head cover and the pump head housing bottom). This insures that the rollers depress the entire width of the tubing as they turn. Manually rotate the roller assembly and guide the tubing between the rollers and the pump head wall. When using tubing (not links), there should be a small but visible gap between the tubing and the pump head housing for about 1/3 to 1/2 of the contact surface at any time. Pull gently on the input and output sides of the tubing to create a gap between the tubing and the curved pump head housing wall.

4. Replace the plexiglass cover over the pump head being sure to tighten down the thumb nuts to prevent the tubing from moving during operation.

The plexiglass pump head cover is reversible on the Jr. models with a different size protrusion on each face. If the tubing is smaller than 3/16" ID, place the cover so that the larger protrusions hold the tubing. If the tubing is 3/16" ID or larger, reverse the cover.

On the Preston models adjust the two screws on the retainer clamp to hold the tubing in place after attaching the plexiglass cover to the pump head. If the tubing is smaller than 3/16" ID and a tubing link is not used, cover the tubing at the clamping points with a small section of a larger tubing to increase the grip to prevent the tubing from creeping in the pump head or use a tubing connector on the input of the pump head.

FOR OPTIMUM TUBING LIFE
Periodically move the tubing so that a different segment is in the pump head, or change the tubing link. This will avoid excessive tubing wear at any specific point. Always move the worn tubing to the suction side of the pump.

PUMP CONTROLS

1. Make sure the flow speed control is set to the minimum setting.
2. Turn the power switch on. Increase the flow speed setting to start the pump action. The higher the number selected, the faster the speed of the pump.
3. Break in a new pump by allowing it to run at less than maximum capacity for the first few hours.
4. Varistaltic pumps are self priming. To begin pumping select a flow direction with the flow direction switch and insert the intake and output tubing into a reservoir and turn the unit on. Prime the tubing for at least 5 minutes. If accurate flow control is important, allow the pump to prime for about 20 minutes to achieve stable flow conditions.

SAFETY AND SAFETY FEATURES

1. Observe safety precautions at all times, especially when pumping dangerous liquids. Always have the plexiglass cover properly mounted on the pump head and, in general, protect the pump area from accidental spillage of liquid.

2. If the pump runs unusually noisy or if bunching of the tubing in the pump can be observed, make sure the tubing is clamped down tightly and/or replace it with a new piece of tubing.

3. The Manostat Varistaltic Pumps should be grounded at all times.

4. The pump is equipped with a current limiting circuit which will slow the motor down if tubing which is too hard or with an oversized wall thickness is used or if the intake or discharge lines become restricted. Use only Manostat tubing.

5. In case of shorts or liquid entry into the case the unit is fused. Replace the fuse only with the same type and rating. The fuse value is stated on the rear panel.

MAINTENANCE

Power Caution
Remove power from the drive before attempting any maintenance.

The speed control circuit has solid state components which do not require service. An excessive load on the system may, however, cause the fuse to blow. An indication of this would be, that the switch does not light with power applied to the drive and the on-off switch in the on position . If this condition occurs, remove power from the unit and remove the fuse from the fuse holder located on the rear of the drive. Replace the fuse with a fuse of the same type and rating. This information is printed on the rear of the unit.

Exact motor brush and commutator life will depend on duty cycle and motor operating speed. Brushes should be inspected every six months or after 2000 hours of operation, which ever occurs first. Replace when less than 0.300" long. The commutator should be inspected periodically and cleaned if necessary. If preventative

maintenance is not performed, excessive commutator wear or "bridging" between commutator segments will cause excessive current through the controller circuit.

These models are equipped with a tooth-belt and should be inspected for belt wear at the same interval as the brushes. The presence of some "belt dust" inside the drive is normal and will have no effect on the operation of the drive. If the belt is slipping, adjust the tension by loosening the motor nuts that secure it to the motor bracket and swing the motor away from the P.C. board. Once adjusted, tighten the nut. Do not over tighten the belt as this will cause excessive belt wear, bearing wear and noise. Replace the belt if frayed or torn.

CLEANING

Power Caution

Remove power before any cleaning operation is started.

Keep the drive enclosure clean by using a mild detergent solution. Never immerse nor use excessive fluid when cleaning the drive.

REPLACEMENT PARTS

Item	Part No.
Motor brushes (2)	A-3191-CR
Brush Cap (1)	A-3190-CR
Motor 90V Assembly	D-3080-0001
Motor 180V Assembly	D-3080-0002
Pump Pulley	B-3901
Motor Pulley	A-3166
Drive Belt for Simon & Vera	A-1341-0005
Drive Belt for Preston	A-1341-0006
Rubber Foot	A-1390-0004
Knob (for speed pot)	B-1083-0035
Fan (plastic)	B-1247-0027
Fan (metal)	B-1247-0032

Fuse (115V)	B-1115-0057
Fuse (230V)	B-1115-0042
Pump Head Cover Simon & Vera	91-055-075
Pump Head Cover Preston	91-065-110
Knob (pump cover)	B-1083-0063
Tubing Clamp for Preston pump only (115v & 230v)	91-065-130
Line Cord 115v	B-3115
Line Cord 230v(Euro)	B-2938

ACCESSORIES

Simon & Vera	Silicone Tubing Links	Preston
72-310-420	Tubing Link 1/32" ID	75-100-420
72-310-430	Tubing Link 1/16" ID	75-100-430
72-310-500	Tubing Link 1/8" ID	75-100-505
72-310-550	Tubing Link 3/16" ID	75-100-555
72-310-600	Tubing Link 1/4" ID	75-100-605

Teflon® Sinkers - keep intake tube at Bottom of reservoir (set of 2) for 1/16" - 5/16" ID tubing	75-250-100
Foot Switch (115V or 230V)	73-750-000

Autoclavable Dispensing Tips	
Glass tip w/Luer Lock for 3/16" and 1/4" ID tubing	72-648-000
Polypropylene tip w/Luer Lock for 1/16" and 1/8" ID tubing	72-648-020

Autoclavable Stainless Steel Cannulae for use with Luer Lock Dispensing tip	
Cannula 16 Gauge	91-015-210
Cannula 13 Gauge	91-015-220

RETURN OF ITEMS

To limit charges and delays, contact the seller or Manufacturer for authorization and shipping instructions before returning the product, whether within or outside the warranty period. When returning the product, please state the reason for the return. For your protection, pack the product carefully and insure it against damage or loss. Any damages resulting from improper packaging are your responsibility.

SPECIFICATIONS

Output:

Models:

72-310-000	72-310-230
72-312-000	72-312-230
72-315-000	72-315-230
72-317-000	72-317-230
72-370-000	72-370-230
72-372-000	72-372-230

Speed 24-720 RPM

Torque 8.6 Kg-cm. (120 in-oz)

Input:

Operating Voltage/Frequency:

72-310-000	100 - 130 VAC, 60 Hz, 2.1 amps
72-312-000	
72-315-000	
72-317-000	
72-370-000	
72-372-000	
72-310-230	190 -260 VAC, 50 Hz, 1.3 amps
72-312-230	
72-315-230	
72-317-230	
72-370-230	
72-372-230	

Installation Category: Installation category II per IEC 664 (Local level, appliances, portable equipment, etc.)

Environment:

Operating Temperature: 0 to 40 ° C

Storage Temperature: -45 to 65 ° C

Humidity: 10% to 90% non-condensing

Altitude Less than 2000 meters

Pollution Degree: Pollution degree II per IEC 664 (indoor usage - factory floor)

Construction:

Dimensions (L x W x H):

72-310-000 72-310-230 30.5 cm x 22.9 cm x 15.2 cm
72-312-000 72-312-230 (12" x 9" x 6")
72-315-000 72-315-230
72-317-000 72-317-230

72-370-000 72-370-230 30.5 cm x 25.4 cm x 17.8 cm
72-372-000 72-372-230 (12" x 10" x 7")

Weight:

72-310-000 72-310-230 6.8 Kg.
72-312-000 72-312-230 (14.9 lbs.)
72-315-000 72-315-230
72-317-000 72-317-230

72-370-000 72-370-230 7.9 Kg.
72-372-000 72-372-230 (17.4 lbs.)

Color: Black

Material: Painted Steel Housing, Plastic and vinyl

Enclosure Rating: IP22 per IEC 529

WARRANTY

Use only *MANOSTAT* precision tubing with *MANOSTAT* pumps to ensure optimum performance. Use of other tubing may void applicable warranties.

The Manufacturer warrants this product to be free of significant deviations from published specifications. If repair or adjustment is necessary within the warranty period, the problem will be corrected at no charge if it is not due to misuse or abuse on your part, as determined by the Manufacturer. Repair costs outside the warranty period, or those resulting from product misuse or abuse, may be invoiced to you.

The warranty period for this product is noted on the warranty card.

TECHNICAL ASSISTANCE

If you have any questions about the use of this product, contact the Manufacturer or authorized seller.

We reserve the right to make improvement in design, construction and appearance of our products without notice.

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